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XXXIV. *An Account of Professor Winkler's Experiments relating to Odours passing through electrified Globes and Tubes, being the Extract and Translation from the Latin of two Letters sent by that Gentleman to Cromwell Mortimer, M. D. Secretary of the Royal Society. With an Account of the Result of some Experiments made here with Globes and Tubes, transmitted from Leipfic by Mr. Winkler to the Royal Society, in order to verify the Facts before-mentioned, by Mr. W. Watfon, F. R. S.*

Read June 20.
1751. **P**ROFESSOR Winkler, in his first letter to Dr. Mortimer, dated at Leipfic, March 12, 1748, mentions, among other particulars, that if odoriferous substances were included in glass globes and tubes closely stopped, and if these globes were electrified, the smell of the odoriferous substances would as easily as the magnetical power pass through the glass, and be conveyed with the electrical effluvia to considerable distances, upon substances readily conducting electricity: that when a man was electrified with a globe of this sort, the odoriferous matter pervaded his whole body; and that not only his skin and his cloaths, but his breath, saliva, and sweat, were impregnated with the smell of the substance included in the glass. That after these globes had been rubbed a few minutes, the flavour

of their contents would be strongly perceptible upon entering the chamber, in which this operation was performing; and that the substances which he had then tried, were sulphur, cinnamon, and balsam of Peru.

Mr. Winkler mentions, that when he made use of sulphur in his globe, in company with his friend Mr. Haubold, and others, the smell of the sulphur was perceived at more than ten feet's distance, and was so prevalent, that his company was driven away thereby: but that himself staying therein some time longer, his cloaths, his body, and his breath, were infected thereby; and that this smell even continued upon him the next day. Moreover upon his repeating this experiment, as he had before found, that sulphur had been useful to him, he on the third day found in his mouth manifest indications of an inflamed blood.

After this he wanted to transmit a pleasant odour; and for this purpose employed cinnamon, which under the like circumstances sent forth its odour in great abundance; so that it was not only immediately perceptible to any one entering the chamber, but continued there the next day.

Balsam of Peru, under the like treatment, so impregnated the air of the room, that the cloaths and the breath of the persons therein smelled of the balsam, after having passed through several streets; and that Mr. Winkler, when drinking his tea next morning, still perceived the flavour thereof. A few days after, when the smell of the chamber was gone off, he conducted a chain upon silk lines from thence through the open air into another chamber quite separate from the former. In this second chamber
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he placed a man upon a silk net, who held the chain in his hand, and after having electrified him with the sphere containing balsam of Peru for a quarter of an hour, any person, who was perfectly ignorant of what was doing, would immediately smell the balsam therein. The man, who was electrified, said, that his tea next morning had a finer taste than usual.

As these experiments did not succeed here, though attempted with a due attention to whatever could be imagined necessary thereto ; and as they had done so no-where upon the continent, Italy alone excepted, Dr. Mortimer was desired by the Royal Society to acquaint Mr. Winkler of this want of success, and at the same time to desire him to transmit hither, not only a circumstantial account of the manner of making his experiments, but likewise, lest the difference of the result might arise from employing different kinds of glass, some globes and tubes fitted up under his own eye in the most advantageous manner. This Mr. Winkler was so obliging as to comply with ; and accordingly the Society has received from him two globes and four tubes ; and at the same time this gentleman sent a letter to Dr. Mortimeri dated at Leipzig, Nov. 23, 1750, of which the following is a translation from the Latin of so much as relates to these matters.

“ You desire me, as soon as the grief for the loss
 “ of my wife would permit me, to explain, in the
 “ most clear and intelligible manner, my experi-
 “ ments, whereby spices and balsams, by their fra-
 “ grance, pervade glass, when electrified. Glass globes
 “ and tubes ought to have this property, that, when
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“ the latter are rubbed backwards and forwards
 “ through the hand, or the former with the hand
 “ applied thereto, they give manifest tokens of the
 “ electric power. Moreover the glass of these tubes
 “ and globes ought to be thin; lest the thickness of
 “ the glass should prevent the transmission of the
 “ odours. It is necessary, that the spices be dry, and
 “ broken small, and that spirituous liquors, as well
 “ as the more liquid balsams, should be well mixed
 “ with powder’d chalk. But how great the quantity
 “ may be, either of the spices, balsams, or spirituous
 “ liquors, which should be included, cannot be de-
 “ termined; because it is not yet certain, how much
 “ of the electrical power is necessary for dissolving
 “ the odoriferous particles, and carrying them along
 “ with it. But as the fact itself is manifest, I have
 “ taken upon me to transmit to the Royal Society, for
 “ which I have the highest regard, two globes and
 “ four tubes. I hope, that these tubes, when rubbed
 “ as usual between the hands furnished with a piece
 “ of thin and somewhat rough cloth, and that these
 “ globes, if mounted upon the pillars of an electrical
 “ machine, and either rubbed with a naked but very
 “ dry hand, or with a piece of silk or woollen cloth,
 “ will transmit odours, plainly different from the
 “ odour of the electric matter, and which persons
 “ here at Leipzig of good noses have distinctly per-
 “ ceived. To know indeed this difference, it is ne-
 “ cessary, that, before the prepared tube is rubbed, a
 “ tube containing nothing odoriferous be tried; and
 “ lest the friction should be attended with no effect,
 “ great care must be taken that the outward surface
 “ of the globes and tubes be perfectly dry.

“ Of

“ Of the tubes one contains flowers of sulphur:
 “ this was sent me from Dresden by Mr. Haubold,
 “ mathematician and geographer to the king of Po-
 “ land. It is the same sort with one, with which
 “ that gentleman shewed the late Count Saxe the
 “ penetration of the sulphureous odour, when he
 “ was last year at Dresden. In another I have in-
 “ cluded balsam of Peru, mixed with powder'd chalk.
 “ In the third, opobalsamum; and in the fourth,
 “ spirit of wine with chalk.

“ The larger globe contains opobalsamum, and
 “ the smaller beaten cinnamon.

“ In making use of the globe with cinnamon,
 “ this method is to be observed. After that, from
 “ the rotation against the hand or a rubber, the
 “ globe is warmed, let the motion be disconti-
 “ nued. After this discontinuance, let the hand
 “ be immediately applied to the globe, and the nose
 “ of any person, who is willing to make the trial, is
 “ to be held within an inch or two thereof; and the
 “ rotation to be repeated by little and little, and to
 “ be made slowly. In this repeated and gentle ro-
 “ tation the observer will perceive the agreeable va-
 “ pour of cinnamon; but this vapour quickly va-
 “ nishes upon continuing the rotation. It is there-
 “ fore necessary, that, as soon as the globe is heated
 “ again, the rotation should be stopped, and be be-
 “ gun again by little and little, when, upon the first
 “ turn of the globe, the exhalation of the cinnamon
 “ will be perceived. And this may be repeated as often
 “ as you please, only observing, as often as the globe is
 “ heated, that after a short respite you begin the ro-
 “ tation of the globe in a very gentle manner.

“ I beg of you, fir, in the most solemn manner, that you would explain these rules to Mr. Watſon, and intreat him, that, when the trials of these globes and tubes shall be made in the presence of several persons, all these circumstances may be regarded; lest any thing be omitted, which may conduce to the knowledge of the truth.”

The tubes and globes referred to in the above letter were received by the Royal Society about the middle of May 1751, and were presented to that body by the President at their next meeting; and they were put into my hands, in order that their effects upon trial might be reported at a future meeting.

The largest sphere was of crystal glass of about seven inches diameter, fixed to its wooden spindles by a resinous cement, and contained not more than half an ounce of a terebinthinate fluid, less deep in colour than balsam of Peru, and more so than balm of Gilead. The smaller globe was five inches in diameter, was mounted nearly as the larger one, and contained about half an ounce of beaten cinnamon. The tube containing the flowers of sulphur was two feet in length, and about half an inch in diameter: it, like the globes and the other tubes, was of crystal glass, and in like manner with the rest of the tubes was hermetically sealed. The tube, said to contain balsam of Peru and chalk, was about twenty inches long, and $\frac{3}{8}$ of an inch in diameter: that said to contain opobalsamum was about sixteen inches long, and half an inch in diameter: and that with spirit of wine and chalk was about seventeen inches long, and about half an inch in diameter.

The manner of mounting these globes might be somewhat exceptionable for the purposes intended,

as the necks were fitted to their wooden blocks with a resinous cement without glass stoppers; so that when the globes, from their being rubbed, had warmed the cement, if an odour of the matter contained in the glass had been perceptible, it might have been urged, that it came through the cement with more probability than through the glass: but nothing of this kind could be objected to the tubes, as they were hermetically sealed.

June 12, 1751, there met me at my house, in order to make trial of the effects of these glasses, Martin Folkes Esq; President, Nicholas Mann Esq; Vice-president, Dr. Mortimer and Peter Daval Esq; Secretaries, Mr. Canton, Fellow of the Royal Society; and Mr. Schrader, a gentleman of distinction well known to, and corresponding with Mr. Winkler. The presence of this gentleman was highly agreeable to the company; as he was thereby enabled to satisfy both himself and his friend Mr. Winkler of the zeal and address, which we exerted in order to verify Mr. Winkler's assertions. The weather was dry, and very fit for electrical experiments. Not the least alteration had been made in Mr. Winkler's globes; but as, with its mounting, one of them was too wide to be placed between the posts of my electrical machine, these posts were altered for that purpose.

The largest globe, said to contain opobalsamum, was first put the trial: it was first rubbed a considerable time with a dry hand chalked, and the snaps at the primeconductor were but weak; but upon rubbing the globe, first with the cushion, which I have usually for that purpose employed, and afterwards with red leather, the snaps were much stronger; and Mr. Canton, as well as another gentleman present, were electrified

electrified by turns therewith: but all this while no smell of the balsam could be perceived by any of the company, either upon the equator of the globe, the persons electrified, the prime conductor, or any of the rubbers made use of; though for this purpose we carefully observed, not only the method suggested by Mr. Winkler, but such others, as appeared to us the most conducive to the present purpose. When the globe was heated, indeed by putting our noses near the mounting, we could smell the resin therein; but this was all. We employed quick motion, afterwards we permitted the globe to be still, and then began again with an extremely gentle motion; but still no odour of the balsam could be perceived in the room, though for that purpose a person was called in, well-skilled in these odours, and who, from his coming fresh out of the air, it was suggested might more readily perceive them: but this, he declared, he was not capable of doing.

We next tried the lesser globe containing cinnamon, and most punctually observed Mr. Winkler's directions, as he is more especially exact in what, he thinks, should be observed to make this experiment succeed: but our endeavours were to no purpose, for we could never, after many trials, either smell the cinnamon, or make the electricity the least perceptible upon the prime conductor. This indeed was what I had always heretofore observed, when I endeavoured to make this experiment; as such a quantity of non-electric matter, unless the sides of the globe were very thick, prevented the exciting the electrical power, even when I employed globes much larger than this sent by Mr. Winkler.

We then began with the tubes: As you see by their dimensions, they were, except that containing the sulphur, by much the smallest I had ever seen used for these purposes: but every gentleman has a right to perform his experiments in his own way. Accordingly their power in electrifying was but weak; for though some of them attracted and repelled the leaf-silver tolerably well, yet when a man was attempted to be electrified with them, the snaps from his hand were very small. Of these four tubes, that with sulphur was much the strongest: the next to it, that said to contain opobalsamum; then that with balsam of Peru, and chalk; but the least of all, that with spirit of wine and chalk, which with the common rubbers scarce attracted the silver; but when rubbed by some silk prepared with linseed-oil, and brought by Mr. Canton, the attractive power was increased, though even then it was very little. Mr. Canton has for some time usually rubbed his tubes with this oiled silk, which he has found by experience to produce the greatest effects, but he does not think it proportionably useful in rubbing globes. In their turns the globes and all the tubes were rubbed with this oiled silk; but no one of the company, after very many trials in different ways, could perceive the least odour of the substances contained, either upon the outside of the tubes, or upon the substances electrified thereby.

We thus spent more than two hours without success, in our endeavours to see the effects proposed by Mr. Winkler; for we were unfortunate enough not to be able to verify them in one single instance.

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There appears a very great disparity between the two letters from Mr. Winkler to Dr. Mortimer concerning these facts. In the first we are informed, that the effluvia from balsam of Peru were not only perceptible in the person electrified, and in the air of the room; but that these were carried along with the current of electricity through the open air into another chamber: that his company did not chuse to bear the offensive smell of the brimstone transpiring through his glass; and that it even heated his own blood: that cinnamon also sent forth its odour in great abundance, perceptible to any one immediately entering the chamber, and continuing there till next day.

In the second letter you will perceive, that there is a great abatement of what we were promised to expect from the first: we are there told, that the glass globes and tubes now sent, if they are electrified, transmit odours, not those directly of the substances included, but such as are plainly different in smell from the electrical effluvia, and which, to use his own words, *virior odoratu valentes hic, Lipsiæ distincte senserunt*; so that must we conclude, that our noses are not so good as those of the gentlemen at Leipzig? Mr. Winkler does not even say in his last letter, that he can electrify with the cinnamon-globe, and that the vapours sent from it are to be smelt at the entrance of the chamber; but that, with a great deal of management, they are to be perceived within an inch or two of the globe; which however we had the mortification not to be sensible of with the greatest attention.

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Upon the whole, what shall we say? Shall we believe, that Mr. Winkler, relying too much upon the honesty and veracity of Mr. Pivati, and his pretended extraordinary discoveries, suffered his heated imagination to dictate his first letter to Dr. Mortimer; and that what he then sent, he rather hoped would prove true upon experiment, than what really was so? and that his second letter, in which there is so remarkable a diminution of what was promised in the first, was the retreat of one, who was unwilling to be thought to have communicated to the Royal Society any thing, which would not upon trial come out as he had represented it? But be that as it may; as success both here and abroad has been wanting to the endeavours of those, who have desired to repeat these experiments, I shall determine nothing myself; but, from an undisguised representation of the facts, as they have appeared to me, I shall leave every one to deduce his own conclusion concerning the reality of them.

XXXV. *An Account of the Bishop of London's Garden at Fulham; by Mr. William Watfon, F. R. S.*